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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,848	08/27/2001	Guy T. Blalock	3578 . 1US (92-555.1)	3166
24247	7590	07/27/2004	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			LEURIG, SHARLENE L	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/939,848	Applicant(s) BLALOCK ET AL.	
	Examiner Sharlene Leurig	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 17-23, 25 and 26 is/are rejected.
- 7) ☒ Claim(s) 16 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>101901</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed April 23, 2004 has been entered and acknowledged by the examiner. Claims 1, 2, 7, 11, 14, 16, 19-21 and 24 have been amended.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 11-15 and 19-23 stand rejected under 35 U.S.C. 102(b) as being anticipated by Jones et al. (5,647,785) (of record).

Regarding claim 1, Jones discloses a field emission tip comprising at least a semiconductive material and a conductive material (column 8, lines 21-32). The structure includes a central region including a periphery with a vertical sidewall portion (Figure 6I, element 12a), a tapered portion surrounding the central region and including an inclined surface (44) extending toward an exposed end of the central region and an apex (42) at the exposed end of the central region.

Regarding claim 2, the height of vertical sidewall exceeds a width of the central region.

Regarding claims 3 and 4, the apex comprises a low work function material such as tantalum nitride (column 8, lines 21-22).

Regarding claim 11, Jones discloses a field emission array comprising a substrate (11 and 17), and at least one pointed tip protruding from the substrate, the tip comprising at least one of a semiconductive material and a conductive material (column 8, lines 21-32) and including a periphery. The periphery has a first portion (12a) oriented perpendicularly relative to the substrate and a second portion (42) oriented at an angle relative to the substrate to form an apex, and at least one surrounding element including a surface (44) that tapers toward an exposed end of the pointed tip and that surrounds at least a portion of the pointed tip.

Regarding claims 12 and 20, at least a portion of the periphery (44, 12a) is adjacent the substrate (11, 17).

Regarding claims 13 and 21, a height of the portion of the periphery relative to the substrate exceeds the width of the pointed tip.

Regarding claims 14, 15, 22 and 23, a top portion of the pointed tip (42) comprises a low work function material such as tantalum nitride (column 8, lines 21-22).

Regarding claim 19, Jones discloses a field emission display having an anode display screen (column 10, lines 10-13), a cathode spaced apart from the anode display screen, the cathode including a substrate (Figure 8, elements 11 and 17), at least one pointed tip protruding from the substrate, the tip comprising at least one of a semiconductive material and a conductive material (column 8, lines 21-32) and including a periphery. The periphery has a first portion (15a, 26a, 27a) oriented perpendicularly relative to the substrate and a second portion (42) oriented at an angle relative to the substrate. At least one surrounding element (44) that tapers toward an

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exposed end of the pointed tip surrounds a portion of the pointed tip. The tip is exposed through a gate (46 and 47), a substantial vacuum is formed between the anode display screen and the cathode (column 9, line 27), and a voltage source is associated with the display screen, the gate and the cathode to provide a potential difference between the cathode and the gate and between the cathode and the anode display screen (column 1, line 35).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-10, 17, 18, 25 and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Jones et al. (5,647,785) (of record) in view of Hobart et al. (6,201,342) (of record).

Regarding claims 7, 9 and 10, Jones discloses a field emission tip comprising at least a semiconductive material and a conductive material (column 8, lines 21-32). The structure includes a central region including a periphery with a vertical sidewall portion (Figure 6I, element 12a), a tapered portion surrounding the central region and including an inclined surface (44) extending toward an exposed end of the central region and an apex (42) at the exposed end of the central region, and an apex (42) at the top of the

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structure made of a low work function material such as tantalum nitride (column 8, lines 21-22).

Jones lacks disclosure of the width of the apex, but discloses the desirability of a low voltage field emission tip (column 8, line 58).

It is well known in the art that narrow emitter tips require less voltage to produce emission.

Hobart teaches a field emitter tip made of tantalum nitride that are 1 nm in width, which fits within the claimed ranges of less than 100 nm or 50 nm.

Therefore regarding claims 5-10, 17, 18, 25 and 26, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the field emitter tip of Jones to have an apex of less than 50 nm in width in order to produce a field emitter tip requiring very low voltage to produce electron emission, and thereby lower the power supply requirements of the device.

Allowable Subject Matter

6. Claims 16 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to teach or suggest the combination of limitations as set forth in claim 16, and specifically comprising the limitations of a field emission tip

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having the structure of claim 11, further comprising the surrounding element comprising redeposition material adjacent to the first portion of the periphery.

The prior art of record fails to teach or suggest the combination of limitations as set forth in claim 24, and specifically comprising the limitations of a field emission display having the structure of claim 19, further comprising the surrounding element comprising redeposition material adjacent to the first portion of the periphery.

Response to Arguments

8. Applicant's arguments, see Remarks, filed April 23, 2004, with respect to the rejection(s) of claim(s) 16 and 24 under Jones et al. (5,647,785) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

9. Applicant's arguments regarding the rejections of claims 1-15, 17-23, 25 and 26, filed April 23, 2004 have been fully considered but they are not persuasive. The applicant has argued that Jones et al. (5,647,785) fails to teach or suggest each and every limitation in the claims, and specifically fails to disclose a central region surrounded by a tapered portion with an inclined surface (page 9) or a field emission array with a pointed tip surrounded by an element with a surface that tapers toward an exposed end of the pointed tip (page 9). The examiner disagrees with these assertions, and directs the applicant to Figure 6I of Jones, which depicts each and every one of these limitations.

The applicant further argues that the combination of Jones and Hobart fails to teach or suggest a field emission tip including a central region with a periphery that

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includes a vertical portion and a tapered portion that surrounds the central region or a tapered portion with an inclined surface that extends toward an exposed end of a central region. The examiner disagrees with these assertions, and directs the applicant to Figure 6I of Jones, which depicts each and every one of these limitations.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (571) 272-2455. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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